Cambridge Assessment International Education
Cambridge International General Certificate of Secondary Education

BIOLOGY **0610/21**

Paper 2 Multiple Choice (Extended) **October/November 2019**

45 minutes

Additional Materials: Multiple Choice Answer Sheet
Soft clean eraser
Soft pencil (type B or HB is recommended)

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READ THESE INSTRUCTIONS FIRST

Write in soft pencil.
Do not use staples, paper clips, glue or correction fluid.
Write your name, centre number and candidate number on the Answer Sheet in the spaces provided unless this has been done for you.
DO **NOT** WRITE IN ANY BARCODES.

There are **forty** questions on this paper. Answer **all** questions. For each question there are four possible answers **A**, **B**, **C** and **D**.
Choose the **one** you consider correct and record your choice in **soft pencil** on the separate Answer Sheet.

Read the instructions on the Answer Sheet very carefully.

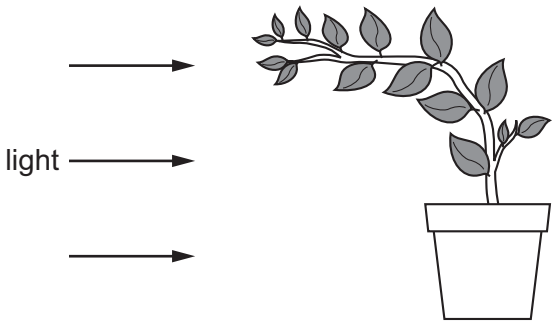
Each correct answer will score one mark. A mark will not be deducted for a wrong answer.
Any rough working should be done in this booklet.
Electronic calculators may be used.

This syllabus is regulated for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

This document consists of **15** printed pages and **1** blank page.

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1 The diagram shows a plant.



Which characteristic of living organisms is shown by the plant in the diagram?

A excretion

B reproduction

C respiration

D sensitivity

2 Using the binomial system of naming organisms, the name of the lion is *Panthera leo*.

Which statement is correct?

A The lion belongs to the kingdom *Panthera*.

B The lion belongs to the genus *Panthera*.

C The lion belongs to the species *Panthera*.

D The lion belongs to the genus *leo*.

3 The table shows the number of animals collected in a sample from a woodland and the groups to which they belong.

animal group	number in sample
arachnids	10
crustaceans	8
insects	80
myriapods	7

How many arthropods in total, in this sample, have six or eight legs?

A 15 **B** 88 **C** 90 **D** 98

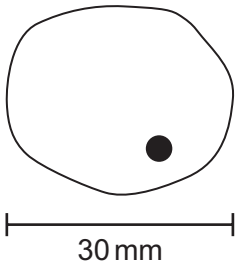
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4 Which features do animal cells share with plant cells?

	chloroplast	cytoplasm	nucleus
A	✓	✓	✓
B	✓	✗	✓
C	✗	✓	✓
D	✗	✗	✗

key
✓ = yes
✗ = no

5 The diagram shows a cell with an actual size of 30 μm.



What is the magnification of the diagram?

A ×10 **B** ×100 **C** ×1000 **D** ×10 000

6 Red blood cells were placed in pure water.

Movement of water across the cell membrane caused a change in their appearance.

What caused this change in appearance?

	direction of water movement	from higher to lower water potential	from lower to higher water potential
A	into cells	yes	no
B	into cells	no	yes
C	out of cells	yes	no
D	out of cells	no	yes

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7 Some examples of substances moving across membranes are listed.

1 glucose molecules into the epithelium that lines the small intestine

2 nitrate ions from a dilute solution in soil into a more concentrated solution in root hair cells

3 water molecules from mesophyll cells into the air spaces of a leaf

For which must oxygen be present?

A 1, 2 and 3 **B** 1 and 2 only **C** 1 and 3 only **D** 2 and 3 only

8 Which identifies the chemical elements found in proteins?

	carbon	hydrogen	oxygen	nitrogen
A	✓	✓	✓	✓
B	✓	✓	✓	✗
C	✓	✗	✓	✗
D	✗	✓	✗	✓

key

✓ = present

✗ = absent

9 What is the correct definition of the term *enzyme*?

A carbohydrates that act as biological catalysts

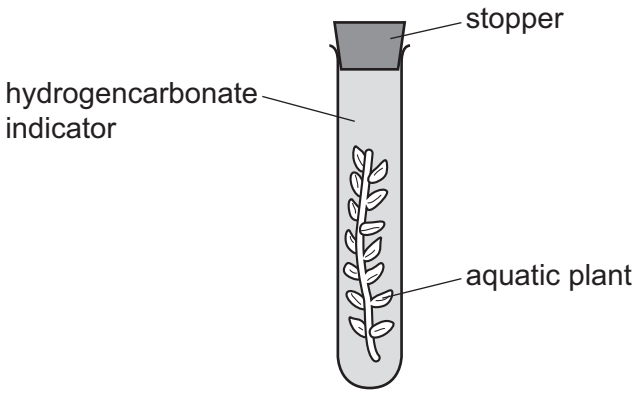
B carbohydrates that act as substrates

C proteins that act as biological catalysts

D proteins that act as substrates

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10 Two sealed test-tubes containing aquatic plants and hydrogencarbonate indicator were set up.



The indicator in the sealed test-tubes shows the concentration of dissolved carbon dioxide present.

concentration of carbon dioxide	colour of indicator
low	red
medium	orange
high	yellow

One of the sealed test-tubes was kept in the light for 24 hours and one of the sealed test-tubes was kept in the dark for 24 hours.

The results are shown in the table.

test-tube kept in	start colour	end colour
light	orange	red
dark	orange	yellow

What is the correct explanation of what has taken place?

A Photosynthesis and respiration both occur in the light, but the rate of photosynthesis is higher.

B Photosynthesis occurs in the light, but respiration does not.

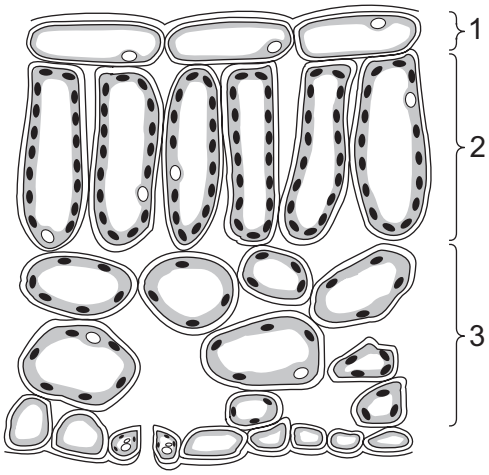
C Respiration can only occur when photosynthesis is not taking place.

D The amount of carbon dioxide used and produced in the light is equal.

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11 The diagram shows a leaf as seen in cross-section under the microscope.

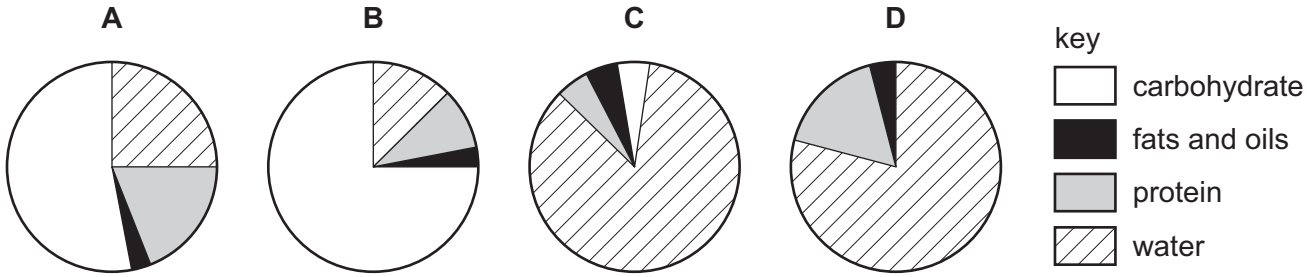


What are tissues 1, 2 and 3?

	1	2	3
A	epidermis	palisade mesophyll	spongy mesophyll
B	epidermis	spongy mesophyll	palisade mesophyll
C	palisade mesophyll	epidermis	spongy mesophyll
D	spongy mesophyll	palisade mesophyll	epidermis

12 The pie charts show the composition of 100 g of four different foods.

Which food provides the most energy?



13 One of the symptoms of the disease cholera is diarrhoea. This is due to water loss by osmosis caused by the cholera toxin.

Cholera toxins result in

A secretion of chloride ions out of the small intestine lowering the water potential.

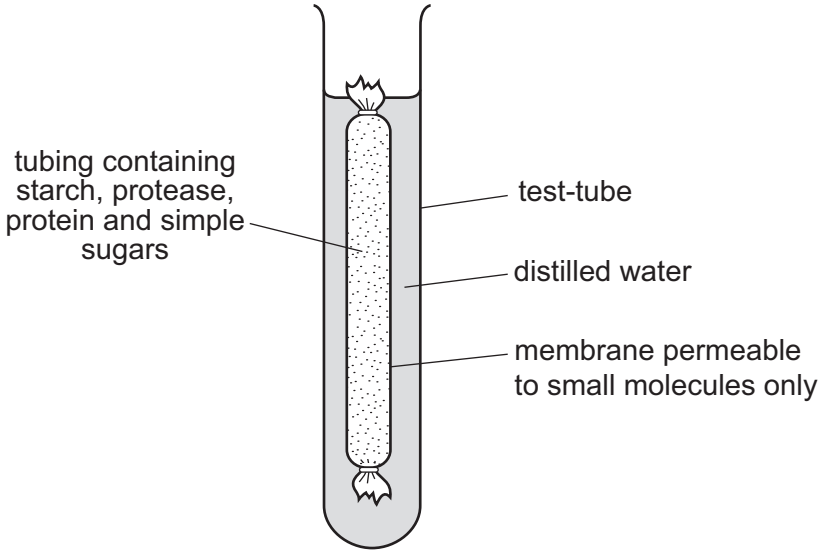
B secretion of chloride ions out of the small intestine raising the water potential.

C secretion of chloride ions into the small intestine lowering the water potential.

D secretion of chloride ions into the small intestine raising the water potential.

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14 The diagram shows an experiment kept at room temperature.



What is present in the water surrounding the membrane after 45 minutes?

A amino acids and simple sugars

B protein and amino acids

C protein and simple sugars

D starch and simple sugars

15 What is an example of diffusion?

A dust particles being moved by ciliated cells in the trachea

B oxygen molecules moving into a red blood cell in the lungs

C pollen grains moving from anthers to stigmas in the wind

D red blood cells moving in a blood capillary in a muscle

16 In plants, what is transported by translocation?

A glucagon

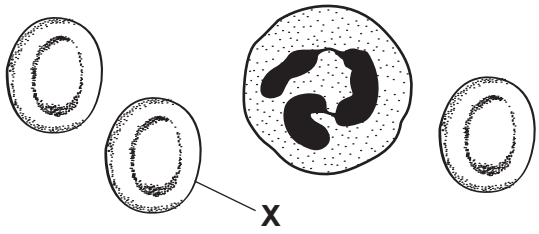
B glycogen

C starch

D sucrose

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17 The diagram shows human blood cells, as seen under a microscope.



What is the function of cell **X**?

A to carry glucose

B to carry oxygen

C to defend against disease

D to make the blood clot

18 Which row describes the features of passive immunity?

	antibodies made	involves memory cells	effective period
A	no	no	short term
B	no	yes	short term
C	yes	no	long term
D	yes	yes	long term

19 Which row shows the approximate percentage of gases in expired air?

	percentage of carbon dioxide	percentage of oxygen
A	12	9
B	4	16
C	24	24
D	27	20

20 What is the correct equation for aerobic respiration?

A $6CO_2 + 6H_2O \rightarrow C_6H_{12}O_6 + 6O_2$

B $C_6H_{12}O_6 + 6CO_2 \rightarrow 6O_2 + 6H_2O$

C $C_6H_{12}O_6 + O_2 \rightarrow CO_2 + H_2O$

D $C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O$

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21 Lactic acid builds up in the muscles during vigorous exercise.

During recovery, how is this lactic acid removed?

A aerobic respiration of lactic acid in the liver

B anaerobic respiration of lactic acid in the muscles

C excretion of lactic acid by the lungs

D removal of lactic acid by the alimentary canal

22 The neurones at synapses contain vesicles.

Which type of substance is found inside the vesicles?

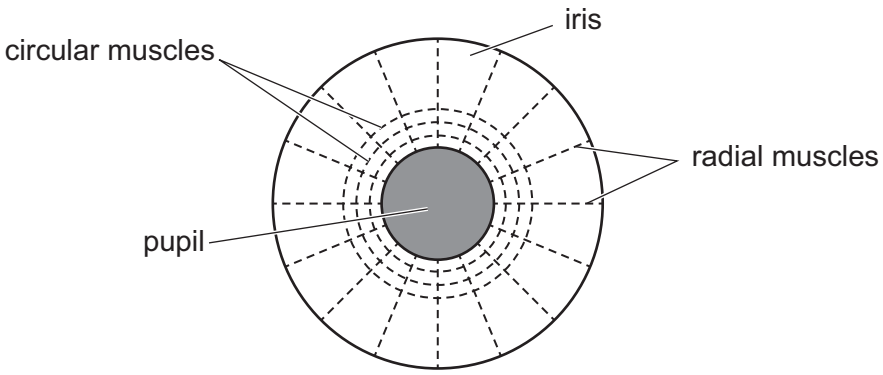
A enzyme

B chromosomes

C neurotransmitter

D steroid

23 The diagram shows the muscles that control the size of the pupil in an eye.



How do the muscles make the pupil smaller?

	circular muscles	radial muscles
A	contract	contract
B	contract	relax
C	relax	contract
D	relax	relax

24 More adrenaline is produced by the adrenal glands when a person is frightened.

This increase affects several parts of the body.

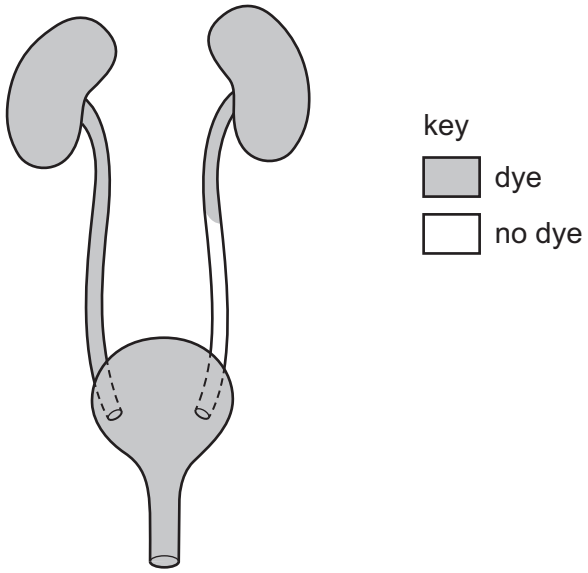
	change	increases	decreases
1	blood glucose concentration	✗	✓
2	heart rate	✓	✗
3	breathing rate and depth	✓	✗
4	dilation of pupil	✗	✓

key
✓ = yes
✗ = no

Which rows are correct?

A 1 and 3 **B** 1 and 4 **C** 2 and 3 **D** 2 and 4

25 A patient has dye injected into the blood supply to his kidneys. The dye appears in his excretory system as shown.



Which part is blocked?

A the kidney

B the ureter

C the bladder

D the urethra

26 Which statement is a reason why viruses are unharmed by antibiotics such as penicillin?

A They are very small in size.

B They do not have a cell wall.

C They have genetic material.

D They have a protein coat.

27 Several athletes have been banned from their sport for using the drug nandrolone. This drug helps the body to build up muscle tissue.

What sort of drug is nandrolone?

A anabolic steroid

B antibiotic

C depressant

D neurotransmitter

28 Which statement about the hormone FSH is correct?

A It stimulates ovulation.

B It stimulates ovulation and menstruation.

C It stimulates the maturation of follicles.

D It stimulates the maturation of follicles and menstruation.

29 HIV is transmitted by body fluids during sexual contact.

HIV affects the immune system.

Which statement best describes the effect of HIV?

A The body has increased immunity.

B The body produces fewer antibodies.

C The body produces more antibodies.

D The number of lymphocytes increases.

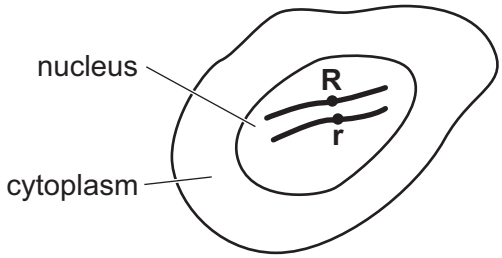
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30 How many chromosomes are there in each of the human cells shown in the table?

	goblet cell	motor neurone	mature red blood cell	sperm
A	0	23	0	0
B	23	23	23	0
C	46	46	0	23
D	46	46	46	23

31 The diagram shows a diploid cell and alleles **R** and **r** on one pair of chromosomes.



When this cell divides by mitosis, which daughter cells will be produced?

	chromosome number	genotype
A	diploid	heterozygous
B	diploid	homozygous
C	haploid	heterozygous
D	haploid	homozygous

32 The diagram shows breeding rats where the allele for grey fur is dominant to white fur.

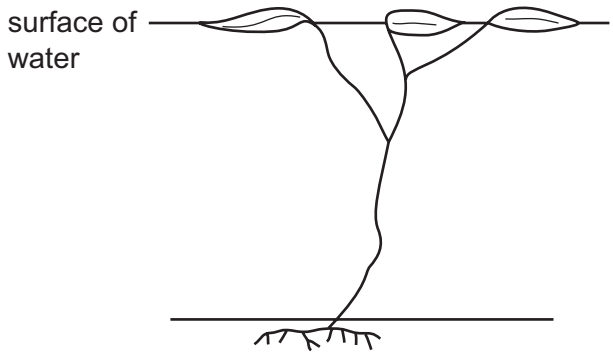


Which two individuals are definitely heterozygous for fur colour?

A 1 and 4 **B** 2 and 3 **C** 2 and 5 **D** 3 and 6

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33 The diagram shows a hydrophyte in a lake.



Which statement about the leaves is correct?

A They cannot photosynthesise.

B They have a thick cuticle.

C They have large air spaces in the spongy mesophyll.

D They require many xylem vessels for support.

34 Some disease-causing bacteria survive treatment with an antibiotic.

Which statement about the surviving bacteria is correct?

A The antibiotic will work better on the next generation of bacteria.

B The bacteria have undergone a process of natural selection.

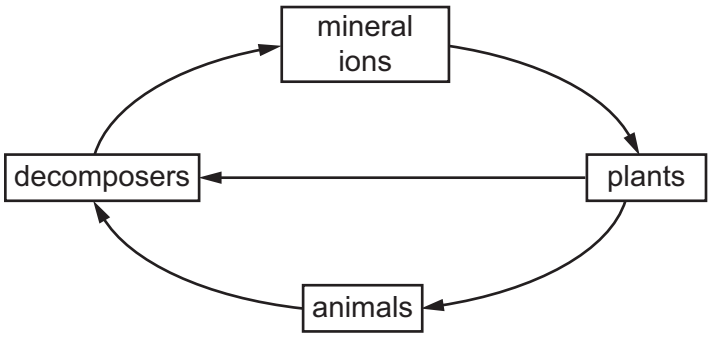
C The bacteria will now be resistant to all antibiotics.

D The resistance of the bacteria is a result of selective breeding.

35 Which row describes the energy flow into and through a food chain that starts with a plant?

	energy entering a food chain	energy transferred between organisms in a food chain
A	chemical	chemical
B	chemical	heat
C	light	chemical
D	light	heat

36 The diagram shows part of the nitrogen cycle.



What is one of the mineral ions?

A amino acids

B nitrate

C nitrogen

D protein

37 Which part of a bacterial cell makes it useful in genetic engineering?

A cell wall

B cytoplasm

C flagellum

D plasmid

38 Which enzyme would be used in a biological washing powder?

A DNA ligase

B lactase

C pectinase

D protease

39 What are the possible effects of deforestation?

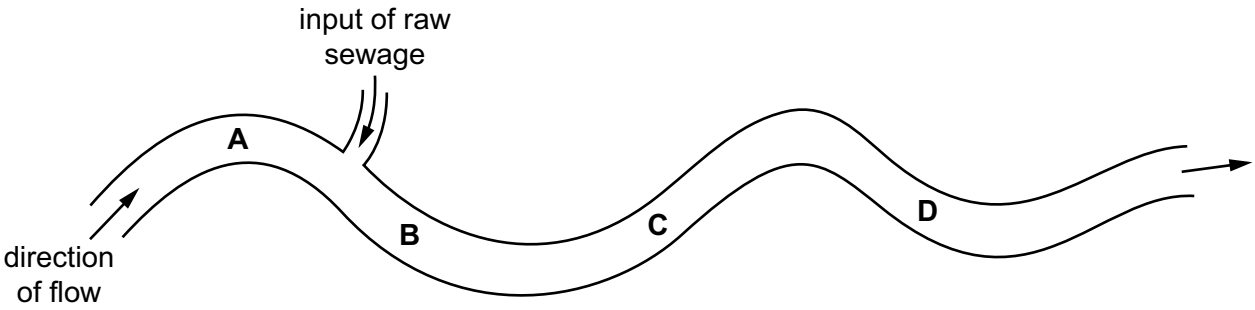
	loss of soil	flooding	decrease in atmospheric carbon dioxide
A	yes	yes	no
B	yes	no	yes
C	no	yes	no
D	no	no	yes

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40 The bloodworm is an organism that is found in heavily polluted water.

The diagram shows where raw sewage flows into a river.

Where would there be fewest bloodworms?



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